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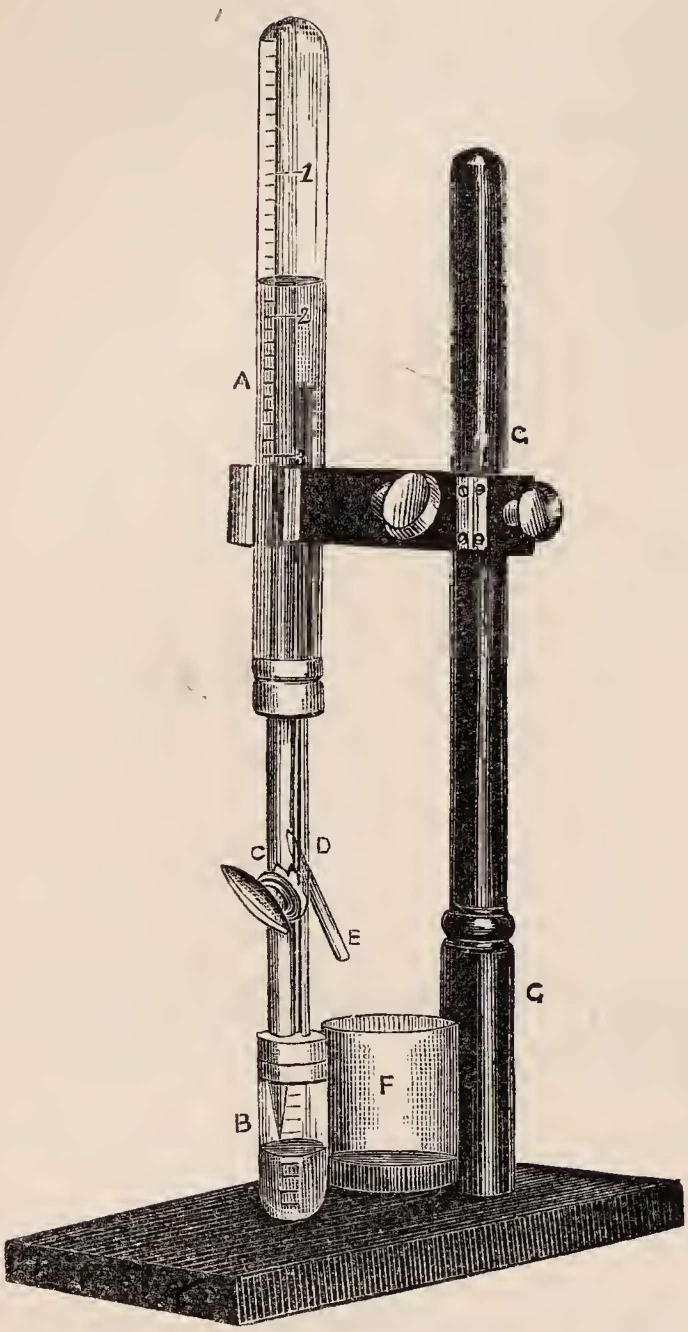
ON A NEW AND CONVENIENT FORM OF UREOMETER FOR CLINICAL USE.

By J. Galley Blackley, M.B., Lond.

Having lately had occasion to make a considerable number of quantitative determinations of the urea contained in urine, I have been much struck with the want of a simple form of apparatus which should give results sufficiently accurate to be of real service in any prolonged series of observations.

The more exact methods for the determination of urea in organic liquids are far too complex and tedious to be of more than occasional service to the busy medical man, whilst the readier methods are not sufficiently accurate to be of more than approximate value. The method of estimating urea by means of a solution of hypobromite of soda, given by Hüfner (*Journ. f. prakt. Chemie* [2], iii, 1), and the modification of it proposed by Messrs. Russell and West, are on the whole the most convenient for clinical purposes, but even these leave something to be desired on the score of accuracy.

With the view of simplifying the operation of ureometry to the



utmost extent compatible with the necessary degree of accuracy, I have devised the simple form of apparatus represented in the accompanying wood-cut, which is in fact a modification of Russell and West's ureometer. It consists of two graduated tubes, a larger one, A, of about 75 c.c. capacity, and a smaller one, B, of about 15 c.c. capacity, closed by perforated india-rubber stoppers, through which pass the tubes C and D. C is the wider of the two, and is provided with a glass stop-cock; its lower extremity drawn to a fine point descends about half way into the tube B; D is a narrower tube, and ascends about half way inside A. E is a short, slightly bent tube, passing through the india-rubber stopper into the tube A, and serving as an egress for the superfluous contents of A, which are collected in the beaker F, the whole being supported by the wooden stand G G.

The method of using the apparatus is as follows :—

Five cubic centimeters of the liquid to be examined are placed in the tube B, and the cork inserted to the level of a scratch on the outside of the tube, the stop-cock being turned off. The tube A is now filled with a solution of hypobromite of soda, and its stopper inserted. The apparatus is then placed in position on the stand, and the stop-cock gradually opened. The hypobromite solution flows down the tube C, decomposition takes place, and the gases evolved ascending through the tube D, are collected in A. The superfluous hypobromite solution flows out through the tube E into the beaker F. To complete the operation the apparatus is removed from the stand, after placing the finger over the mouth of the tube E, and agitated for a few moments. It is then replaced, and after allowing time for the froth to subside the quantity of gas collected is read off. After subtracting the small constant of air contained in the tube B, the remainder gives by calculation the quantity of urea present in the 5 c.c. of liquid examined. Under ordinary circumstances the whole operation may be completed in five or six minutes.

Instead of having the tube A graduated in cubic centimeters, I have found it convenient to use the tube supplied with Messrs. Russell and West's ureometer, which is graduated so as to show at once without calculation the percentage of urea contained in the liquid under examination.

The following numbers obtained, after taking solutions of urea of known strengths, will serve to give an idea of the degree of accuracy obtainable with the apparatus. The solutions employed contained 10 and 20 grams per litre respectively, 5 c.c. being taken in each experiment. The numbers in the third column are obtained from those in the second by multiplying by $\frac{100}{92}$, and the pretty close agreement between the numbers thus found and the quantities actually taken, quite bears out the statement of Messrs. Russell and West that there is a deficiency of about 8 per cent. in the amount of nitrogen given off when hypobromite of sodium acts upon urea.

	Experiment 1.	Experiment 2.	Experiment 3.
Weight taken ..	0·0500 gram	0·1000 gram	0·1000 gram
Weight of urea calculated from actual vol. of N obtained	0·04756 ,,	0·9384 ,,	0·9062 ,,
Corrected weight of urea found ..	0·0517 ,,	0·1020 ,,	0·985 ,,
Ratio of weight taken to corrected weight found	1 to 1·034 ,,	1 to 1·020 ,,	1 to 0·985 ,,

The apparatus is in the hands of Messrs. E. Cetti and Co., of Brooke Street, Holborn, and may be obtained from them.

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